

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Examine the
Commission's Future Energy Efficiency Policies,
Administration and Programs.

Rulemaking 01-08-028
(Filed August 23, 2001)

CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing *Response To Administrative Law Judge's Ruling Regarding Evaluation, Measurement And Verification Of Local Energy Efficiency Programs* by emailing this document to all email addresses on the R.01-08-028 service list and sending a hard copy to the CPUC docket office and the ALJ via overnight mail. A list of the email addresses is included with this filing.

Dated: July 2, 2002

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**RESPONSE TO ADMINISTRATIVE LAW JUDGE'S RULING REGARDING
EVALUATION, MEASUREMENT AND VERIFICATION OF
LOCAL ENERGY EFFICIENCY PROGRAMS**

**EM&V Contractor Qualifications
and Notification of Interest**

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July 2, 2002

Newcomb Anderson Associates' Qualifications to Perform EM&V

Newcomb Anderson Associates respectfully submits the following statement of qualifications to perform evaluation, measurement and verification services for the 2002-2003 CPUC third-party local energy efficiency programs. Newcomb Anderson Associates is widely recognized as a leading energy consulting and engineering firm and is overwhelmingly qualified to provide evaluation, measurement and verification services for a wide variety of energy management programs:

- We have provided energy engineering services for investor-owned utilities and municipal utility districts for over 10 years, with the vast majority of this work involving programs subject to CPUC scrutiny; our work is consistently of the highest quality as is required by these programs.
- We have provided similar EM&V services for other program implementers under recent CPUC public goods charge programs.
- We have assisted clients with applications for utility, state, and federal funding for nearly 20 years. We provide the majority of the program management services for PG&E's primary incentive program, the SPC program, so we are extremely familiar with and experienced in the requirements of public goods programs authorized by the CPUC.
- Because of the depth of our expertise in energy efficiency technologies and programs, a substantial portion of our work comprises due diligence and peer review of other energy consultants' work. We have provided these high level energy engineering services to Verizon, the California Energy Commission, the City of Oakland, and Pacific Gas and Electric, among others.
- We have a full time, in-house team of comprehensive, energy management expertise, including Architects, registered Mechanical and Electrical Engineers, Association of Energy Engineers (AEE) Certified Energy Managers, AEE Certified Cogeneration Professionals, AEE Certified Lighting Efficiency Professionals, AEE Certified Energy Procurement Professionals, Designers, Lighting Specialists, CAD Operators, Technical Editors, and full support staff. Many of our technical staff members hold Master's degrees in engineering, architecture or business administration.
- Our engineers have reviewed, analyzed, developed and/or designed more than 25,000 energy projects in over 15,000 commercial and public buildings, including hospitals, multi-unit residential facilities, courthouses, universities, naval and air force bases, police stations, fire houses, retail outlets, libraries, DOE laboratories, schools, prisons, office buildings, and many others. These projects have resulted in annual energy savings in excess of \$200 million.

We respectfully submit the following answers to CPUC questions for potential EM&V independent contractors as outlined in Decision D.02-05-046.

Newcomb Anderson Associates' Qualifications to Perform EM&V

Identification of the Recipient(s) and local energy efficiency programs for which the Contractor proposes to perform EM&V services;

Newcomb Anderson Associates proposes to provide EM&V services for the following programs:

Program Title	Program Implementer
Mobile Energy Clinic	ADM Associates
Upstream High Efficiency Gas Water Heater Program	ADM Associates
Green Schools, Green Communities	Alliance to Save Energy
Comprehensive Hard-to-Reach Residential and Small Commercial Energy Savings Program	American Synergy Corporation
The Energy Savers Program	ASW Engineering
Pre-Rinse Spray Head Installation for the Food Service Industry	California Urban Water Conservation Council
Agriculture Pumping Efficiency Program	Center for Irrigation Technology, CSU Fresno
Building Department and Small Builder Title 24 Standards Training	CHEERS
Comprehensive Energy Efficiency Program	City of Davis
Stockton Area Comprehensive Local Proposal	City of Stockton/InSync
A Local Small Business Energy Efficiency Program	Ecology Action of Santa Cruz
Energy Star CFL Program for Small Hardware and Grocery Retailers	Ecos Consulting
Litevend	Ecos Consulting
Interest Rate Buy-Down for the Installation of High-Efficiency HVAC Equipment	Electric & Gas Industries Association
Local Small Commercial Energy Efficiency and Market Transformation Program	Energx Controls, Inc.
The Energy District Approach for Sustainable Energy Efficiency in California	Energy Coalition
LightWash	Energy Solutions
California Variable Speed Drive Farm Program	EnSave Energy Performance, Inc.
Energy Efficiency in Commercial Food Service	Fisher-Nickel, Inc.
Green Building Technical Support	Frontier Associates
Green Building Technical Support Services	Frontier Associates
Promote Geoexchange to SCE Commercial and Educational Customers	Geothermal Heat Pump Consortium
Energy Efficiency Services for Electricity Consumption and Demand Reduction in Oil Production in the State of California	Global Energy Partners

Newcomb Anderson Associates' Qualifications to Perform EM&V

Program Title	Program Implementer
Demand Control Ventilation Pilot Program	ICF Associates, Inc.
Proposal of the California Local Government Commission for Regional Energy Authority Pilot Projects in Humboldt, Marin, and Ventura Counties	Local Government Commission
Energenius	PG&E
Pacific Energy Center (PEC)	PG&E
School Resources Program	PG&E
Delivering Energy Efficiency Services to Local Independent Grocery Sector	Portland Energy Conservation, Inc.
Check Me	Proctor Engineering Group Ltd.
Municipal Wastewater Retro-Commissioning (PG&E Territory)	Quantum Consulting, Inc.
Municipal Wastewater Retro-Commissioning (SCE Territory)	Quantum Consulting, Inc.
The Oakland Energy Partnership Program	Quantum Consulting, Inc.
Proposal to Provide a Small Nonresidential Energy Fitness Program	Richard Heath & Associates, Inc.
South Bay Communities & Affiliates Energy Efficiency Program	Rita Norton & Associates
The Energy Savers Program	RLW Analytics
The Energy Savers Program	RLW Analytics, Inc.
Agriculture, Water and Energy Program	San Diego Regional Energy Office
Cool Communities Shade Tree Program Proposal	San Diego Regional Energy Office
Direct Install Small Commercial Program	San Diego Regional Energy Office
Energy Resource & Education Center	San Diego Regional Energy Office
K-12 Energy Education Program	San Diego Regional Energy Office
Public Agency Information and Technical Support Program	San Diego Regional Energy Office
Compressed Air Management Program	SBW Consulting, Inc.
Compressed Air Management Program	SBW Consulting, Inc.
Codes and Standards Program	SCE
Demonstration and Information Transfer	SCE
Local Government Initiative	SCE
Small Nonresidential Hard to Reach Program	SCE
Diverse Markets Outreach Program	SCG
Nonresidential Financial Incentives Program	SCG
Local K-12 Schools Energy Efficiency Program	SCSA
Codes and Standards	SDGE

Newcomb Anderson Associates' Qualifications to Perform EM&V

Program Title	Program Implementer
EZ Turnkey Program	SDGE
Hard to Reach Lighting Turn In Program	SDGE
In-Home Audits Program	SDGE
Small Business Energy Assessments	SDGE
Pump Test and Hydraulic Services Program	Southern California Edison
Proposal for a Local K-12 Schools Energy-Efficiency Program	State and Consumer Services Agency
Regional Energy Efficiency Initiative (Six Cities Energy Project)	The Energy Coalition
Comprehensive Compressed Air Program	Xenergy

We are available and qualified to provide services for all programs approved by the CPUC for 2002-2003 funding. Any programs that are not listed above were generally excluded either because the programs target market sectors outside our typical business line or to avoid any perception of conflict of interest because we have current contracts with the program implementers, with the following exceptions:

- We have had contractual relationships with RLW Analytics and the California State University Chancellor's Office in the past, but do not currently have any working relationship with them, and therefore see no conflict of interest.
- We currently have an open contract with PG&E as an independent technical reviewer, which is similar in nature to the services being proposed, and therefore see no conflict of interest.
- Energy Solutions is a subcontractor to Newcomb Anderson Associates on a CPUC-funded program, however as our subcontractor we in no way receive any revenue from them and foresee no conflict of interest.

An explanation of why the Contractor is independent of Recipient;

Except as noted above, Newcomb Anderson Associates has had no prior working relationship with any of the program implementers listed above and played no role in the development of the proposed programs.

A list of all work the Contractor has done with or for the Recipient;

Except as noted above, Newcomb Anderson Associates has had no prior working relationship with any of the program implementers listed above.

An explanation of any factor that might lead a reasonable person to question whether the Contractor is actually independent of the Recipient;

Except as noted above, Newcomb Anderson Associates has had no prior working relationship with any of the program implementers listed above and is unaware of any potential reasons for additional inquiry.

Newcomb Anderson Associates' Qualifications to Perform EM&V

A description of any reason why the Commission might not select the Contractor (e.g., Contractor's outstanding state tax liens, present or former bankruptcy, pending civil or criminal litigation or other proceedings, license suspensions or other similar actions, or criminal convictions);

There are no reasons why Newcomb Anderson Associates should not be selected to provide these services. Newcomb Anderson Associates' parent company underwent a reorganization prior to Newcomb Anderson Associates' acquisition. Newcomb Anderson Associates has no outstanding state tax liens, present or former bankruptcy, pending civil or criminal litigation or other proceedings, license suspensions or other similar actions, or criminal convictions.

Newcomb Anderson Associates approaches all projects in a collaborative way, working with our client and its customers towards achieving the maximum success of any given project. The goal of the CPUC Incentive Programs is to ensure installation of energy efficient technologies that will ultimately reduce the state's need for additional energy capacity and reliance on outside energy sources, not simply to audit projects and issue a "pass or fail" grade. We will have this goal at the forefront of our thinking as we work with program implementers and the project applicants.

In the process of evaluating our submittal, you will find that Newcomb Anderson Associates is overwhelmingly qualified and experienced not only to meet but exceed the goals and expectations of EM&V services for a wide range of programs. The enclosed Statement of Qualifications outlines the San Francisco-based firm's 19+ years of superior quality services. If we can provide any additional information or answer any questions, please contact me directly at (415) 434-2600. We look forward to working with the CPUC towards the success of these very important programs.

Sincerely,

Renée T. Fernandez
Director of Business Development
Newcomb Anderson Associates

RTF/jsb



STATEMENT OF QUALIFICATIONS

**PROVIDING A COMPLETE RANGE OF
ENERGY ENGINEERING AND
PROGRAM MANAGEMENT SERVICES**

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COMPANY OVERVIEW

Newcomb Anderson Associates is a consulting and design engineering firm that has been devoted exclusively to the field of energy engineering for institutional, industrial and commercial facilities since its inception in 1983. Newcomb Anderson Associates has performed energy efficiency analysis and design for a wide variety of facilities, including federal buildings in Alaska, power plants in Washington, state prisons in California, FAA facilities in Texas, high rises in New York, printing plants in Great Britain, hospitals in Australia and Japan, commercial laundries, office buildings, courthouses, warehouses, manufacturing plants, apartment complexes, university campuses, and one-room schoolhouses. Newcomb Anderson Associates staff are extremely familiar with all types and sizes of commercial, institutional, and industrial facilities and their energy-using systems.

Newcomb Anderson Associates provides a wide variety of energy efficiency services, including energy project scoping studies, ASHRAE level II and III energy efficiency studies, heating and cooling load simulations, and detailed building energy use modeling. The work also includes energy project funding document preparation, energy program development and review, electric and thermal load studies, power generation and off-peak cooling feasibility studies, and new design review for energy efficiency. The firm's design work includes equipment sizing, complete project design and specification, construction assistance, and commissioning. Newcomb Anderson Associates also provides pre- and post-project monitoring and verification, project verification site surveys, and training of client technical staff.

ENERGY ENGINEERING & CONSULTING SERVICES

Scope of Services

Newcomb Anderson Associates provides comprehensive energy management services, specializing in the following areas. Services are tailored for each customer, according to the customer's needs.

- Program Development
 - Energy Master Plans
 - Prioritization of efforts and resources
 - Comprehensive databases of customer facilities and equipment
 - Evaluation of supply-side options
 - Utility cost and tariff review
 - Implementation method recommendations
 - Design guidelines
 - Utility incentive program compliance and application preparation
- Energy Engineering
 - Benchmark reports
 - Preliminary audits and scoping studies
 - Investment grade audits
 - Equipment metering
 - Load profile analysis
 - Comprehensive targeted studies (feasibility and constructability)
 - Implementation plans
 - Cogeneration analysis and design
- Full Service Implementation
 - Design engineering
 - Equipment specification and selection
 - Construction
 - Commissioning
 - Training of building staff
- Follow-up Services
 - Measurement and Verification
 - Operations and Maintenance
- Specialty Products
 - EMCOR Energy Edge
 - Web-based screening tool to evaluate building performance and savings potential
 - Enterprise Energy Management
 - Internet-based platforms that use artificial neural networks and two-way Internet communications to control building loads in real-time
 - Analysis Tool Development
 - Tool suites customized for the specific client

Energy Audits

Newcomb Anderson Associates has performed thousands of energy audits for utilities, local, State and federal governments, and private sector clients. These audits have ranged from walk-through energy surveys to ASHRAE Level III detailed audits. Newcomb Anderson Associates has been the prime contractor for a number of California Energy Commission (CEC) energy programs involving thousands of buildings statewide. The firm has analyzed over 700 buildings for energy efficiency for the Naval Facilities Engineering Command (U.S. Navy). Newcomb Anderson Associates has analyzed and/or designed energy projects involving over 300 State-owned buildings for the California Department of General Services, Energy Assessments Section.

Newcomb Anderson Associates has provided energy savings performance contract (ESPC) studies for federal facilities under the auspices of DOE SAVEnergy Program. These contracts cover two DOE regions in the western U.S.: Region 8 serves Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming. Region 9 serves Arizona, California, Guam, Hawaii, Nevada, the Trust Territory of the Pacific Islands, Alaska, Idaho, Oregon, and Washington. To-date, Newcomb Anderson Associates has completed energy and water conservation studies for over 40 federal facilities in these two regions. These facilities have included a wide variety of functions and construction types, including historical buildings. They have included Air National Guard bases, forestry labs, visitor centers and display areas, laboratories, hospitals, post offices, office buildings, national park headquarters and dormitory facilities, and high security Department of Energy sites.

Building Simulations

Most energy audits have included a building energy simulation of some type. Past projects that involved substantial building simulations include the Barstow Marine Corps Logistics Base (30 buildings, totaling over 1.8 million square feet), Fallon Naval Air Station (232 buildings, totaling over 1.5 million square feet), CSU Sacramento, Pasadena City College, the Huntington Beach Main Library, and many others. These were for both new and existing buildings and utilized DOE 2.1, Power DOE, Trane Trace, Carrier HAP, or other software. The staff has performed building simulations for both existing buildings, for which the model can be calibrated against metered energy use, and for new construction, for which there is no prior metered use to calibrate the model.

Deregulation Consulting

The deregulation of the electric industry has created substantial opportunities for end users to increase operational efficiency, competitively procure electric power, and substantially reduce utility operational costs. Newcomb Anderson Associates offers a unique combination of capabilities to assist our customers in the analysis of their present usage and the development of a strategic plan for negotiating power contracts with unregulated power providers. A thorough understanding and accurate forecasting of power use patterns is essential in retail power contracting, for both the end user and the energy provider.

Newcomb Anderson Associates will draw upon our extensive experience to analyze a facility's power consumption systems to fully understand the present operating load profile. Our engineering analysts then review the dynamics of the facility's operation to develop

methodologies to altering that profile to minimize power costs while maintaining operational needs. Rigorous modeling examines operational alternatives, future load projections, load management strategies, aggregation, and self generation, to provide comprehensive power management strategies for evaluation of power supply offerings.

Using these strategies, our engineering analysts work with the customer to solicit and evaluate various power supply proposals and assist with contract negotiations. Thereafter, we will implement the load management strategies and assist the customer with monitoring of power deliveries, bill analysis, and maintaining a constant awareness of further opportunities for utility cost reductions.

Design

Newcomb Anderson Associates' staff has experience in all aspects of project design, including feasibility studies, conceptual design, cost estimating, schematic design and design development, full construction documents, construction phasing plans, bid review assistance, submittal review, construction inspection, change order review, project meeting minutes, and as-built drawings. The firm provides full construction period services for all design projects. This includes project site inspections for drawing and specification adherence, submittal review, punch lists, as-built drawing preparation and, often, operator training for specialized controls and equipment. Staff have supervised and participated in building commissioning for all new design work. Additionally, several clients have contracted with Newcomb Anderson Associates to take over the construction management of projects designed by other firms that ran into trouble during construction. During this work, the design engineer has had to sort through and review hundreds of contractor requests for change orders and determine which were legitimate and which were not, develop alternative designs when the intended design was technically infeasible, and was able to turn a threatened project into a successfully operating system.

Building Commissioning

Newcomb Anderson Associates has participated in the commissioning process for nearly all of its design projects during the past 19 years. These projects include HVAC air-side retrofits, chiller replacements, cooling tower replacements, boiler replacements, lighting upgrades, energy management systems, and many other energy efficient upgrades.

Monitoring and Verification

Newcomb Anderson Associates has provided monitoring and verification (M&V) services employing a variety of methods to the California Energy Commission (CEC), Sacramento Municipal Utilities District (SMUD), the U.S. Navy, the National Park Service, and others. The firm maintains its own data loggers and test equipment for this purpose. For the CEC, Newcomb Anderson Associates has evaluated the success of energy efficiency projects implemented in a variety of public buildings, including schools and office buildings. Newcomb Anderson Associates has contracted with SMUD to provide pre- and post-project metering, monitoring and analysis. Newcomb Anderson Associates has also monitored the electrical use of large scale Navy buildings.

On behalf of the National Park Service, Lawrence Berkeley National Laboratory contracted with Newcomb Anderson Associates to provide M&V services for lighting projects installed in conjunction with a utility demand side management (DSM) bidding program. The lighting projects involved occupancy sensor, photocell, and dual level switching controls; metering of circuit amp-hours was required by the utility to prove savings. M&V services have included performing power meter tests for each lighting circuit to determine correlation between measured amps and kW, setting up amprobes in appropriate ranges for the highest accuracy of measurements, downloading data, and converting 15-minute amp readings to total lighting energy usage (kWh) by time-of-use period.

Newcomb Anderson Associates fully understands and utilizes standard M&V protocols as published by the Department of Energy, which includes the "North American Energy Measurement and Verification Protocol", and the related Federal Energy Management Program document "Measurement and Verification (M&V) Guideline for Federal Energy Projects." These documents provide a common framework to measure energy savings performance.

Lighting

Newcomb Anderson Associates has analyzed or designed energy efficient lighting systems and all associated controls for over 500,000 fixtures. The depth of the firm's experience in energy efficient lighting design has enabled Newcomb Anderson Associates to be called upon by the California Energy Commission, California Department of General Services, and the University of California to evaluate other firms' lighting designs and lighting efficiency programs. Newcomb Anderson Associates has won several national awards for energy efficient lighting designs. In addition, one of Newcomb Anderson Associates' officers is a past member of the California Energy Commission's Advanced Lighting Professional Advisory Committee.

HVAC

We have analyzed, designed and specified high quality, energy efficient, large and small scale HVAC systems for 17 years. These systems encompass all types of configurations, from fan coil units to complex variable air volume systems. Our work involves all types of systems, and includes detailed heating and cooling load analyses and air balancing. Typical recommendations include conversion to variable air volume systems with variable frequency drives and direct digital controls. In addition to analyzing thousands of systems, we have designed new installations and retrofits. These include the award winning (Southern California Edison, Energy User News) HVAC for the Verifone World Distribution Headquarters, in Costa Mesa. We also designed the HVAC renovation of the California State Employment Development Department Site 3 (Solar Wedge) building in Sacramento, which included renovation of the concentrating solar collectors. Newcomb Anderson Associates has analyzed building envelope characteristics and projects, including insulation, glazing, and daylighting, for a wide variety of facility types.

Energy Efficient Boiler Systems

Newcomb Anderson Associates has analyzed and designed central boiler plants with up to 100,000 lbs/hour steam boilers. We have evaluated the feasibility of de-centralizing large central steam or high temperature hot water (HTHW) boiler plants and replacing these plants with distributed equipment or cogeneration systems. These studies have involved detailed analysis of the condition and losses of the steam or HTHW distribution systems. We have completed detailed design of a very involved central plant decentralization project. We have performed in-depth studies of boiler plants for compliance with current or planned air quality regulations, determining the best solution for each plant, based on cost effectiveness, technical feasibility (usually involving space limitations), energy efficiency, and projected changes to Air Quality Management district (AQMD) regulations. Solutions have varied from replacing burners or boilers with low NO_x burners or boilers to installing several small, modular boilers. We have designed five refuse derived fuel incinerator/heat recovery boiler plants now built and operating in California. This includes negotiating AQMD Construction and Operating permits.

Energy Efficient Chiller Systems

Newcomb Anderson Associates' experience with chiller plant analysis and design includes up to 6,000 ton chillers and thermal energy storage (TES) systems. Analysis work has included all types of projects, including the addition of VFD's to increase centrifugal chiller efficiency, the options for eliminating the use of CFC's in chiller plants, the retrofit of 1,000-ton, two-stage absorption chillers, the evaluation of TES under many different rate schedules, the application of waste heat fired chillers to cogeneration systems, the feasibility of district cooling systems, gas engine driven chillers, piggy back chiller systems in large central plants, and alternative air conditioning options such as water source heat pumps and indirect/direct evaporative cooling. Chiller design has included the design of new buildings with direct-fired absorption chillers to eliminate the need for any damaging refrigerants, the retrofit of energy efficient centrifugal and screw chillers onto the roof of existing office towers, the installation of primary/secondary chilled water loops to reduce pumping energy, the installation of energy efficient low approach and low horsepower cross-flow cooling towers, and the use of direct digital controls to optimize the operation of chiller plants.

Energy Monitoring and Control Systems

We have analyzed the cost effectiveness and feasibility of installing or upgrading energy monitoring and control systems in thousands of buildings. This work includes detailed surveys of equipment to be controlled and their operating conditions and schedules. We have performed in-depth feasibility studies and designs for expanding EMCS's for several DOE national laboratories, including Stanford Linear Accelerator Center and Lawrence Berkeley National Laboratory. We were a recipient of the 1998 US Department of Energy (DOE) Federal Energy Management Program (FEMP) award for our EMCS design at the latter site. Our Design Division has designed over 50 major energy management systems ranging in size from 8 to over 2,000 DDC points. These systems have included as many as 10 geographically independent sites and over 100 buildings linked via local area networks. This work spans the complete range of EMCS capabilities, including plant optimization programs, adaptive controls, powerline carrier and laser optic communications, direct digital

controls, and industrial grade programmable logic controllers. These systems are installed, operating, and meeting or exceeding projected energy savings.

High Efficiency Motors

Newcomb Anderson Associates' motor retrofit experience includes energy efficient and premium efficiency motors from 1/8 hp fans to 1,200 hp vertical turbine river pumps and includes the analysis or design retrofits of over 3,000 motors for energy efficiency. This work includes measuring volts, amps, power factor, and kilowatts and performing vibration and motor circuit analyses. In some cases, the speed of the motors and the driven systems are measured with a strobe tachometer to verify the motor loads. For motors with variable loads, instantaneous measurements are often supplemented with continuous data logging. Many of these projects included controls retrofits, including two-speed, variable frequency drive, or other VSD. Motor projects include fans, pumps, compressor drives, and a variety of commercial and industrial process applications. Newcomb Anderson Associates is a consultant to a large utility performing an Electric Motor Performance Analysis Tool (PAT) demonstration project. Under this contract, the firm has performed motor tests and analyzed the resultant data on over 200 motors at industrial sites. The firm is also responsible for identifying modifications to the data collection, analysis, and reporting procedures; tracking changes to the PAT methodologies; and presenting results to the utility and its customers. The firm is an associate member of the Motor Challenge Partnership.

Industrial Processes

Newcomb Anderson Associates has analyzed numerous industrial process plants for energy efficiency. These plants have included soda bottling plants, grain mills, large scale printing plants, electronics manufacturing, precision optical laboratories, ultra high vacuum cooling facilities, clean rooms, particle accelerator cooling loops, plastic manufacturing, and oil refining. Our Industrial Services Consulting Group specializes in analyzing and implementing energy and operational efficiency improvement projects in industrial plants.

Rate Analysis and Real Time Pricing

Newcomb Anderson Associates has provided numerous utility rate analyses for a wide variety of facility types. This has included review of electricity bills and load profiles to ensure the facility is billed on the cheapest rate schedule given its specific usage, detailed evaluation of the site's energy use by time of use to determine actual energy cost savings (\$/kWh) by each measure, analysis of aggregating electric accounts, recommending rate schedule changes after conservation measure implementation based on post-project energy use to further reduce energy costs, and recommending operational changes that will allow a cheaper rate schedule to be used. After careful evaluation of a site's electricity use and rate schedule options, recommendations have included purchasing or building substations so that power can be acquired at a cheaper primary voltage rather than secondary, consolidating multiple accounts to a single account to reduce monthly charges, and switching rate schedules to one that will provide lower energy costs. Other contractual recommendations have included lowering the firm contract demand associated with a curtailable service option. In addition, we have performed a comprehensive (ASHRAE level III) audit on a hospital billed on a real time pricing structure.

Power Quality and Power Factor

Newcomb Anderson Associates has provided numerous analyses and designs for power factor correction and impacts of energy efficient ballasts and variable frequency drives on power quality. New designs have included K-factor transformers, oversized neutrals, VFD's with line reactors for reduced harmonic distortions in accordance with IEEE Standard 519 and other power quality issues. The staff has reviewed power factor correction projects for utility incentives. In new design, the firm has added power factor correction capacitors to motors and analyzed their interaction with local generators.

Electrical Distribution

Newcomb Anderson Associates has performed medium-voltage design for Naval facilities including the selection and coordination of motors, switch gear, feeders, and protective relaying. Existing distribution systems in prisons and hospitals have been analyzed and reconfigurations proposed to increase on-site loading of cogeneration systems. Newcomb Anderson Associates has designed numerous low-voltage (less than 1000V) power distribution systems for new and retrofit construction in commercial and industrial facilities.

Peak Shaving

Newcomb Anderson Associates has analyzed the cost effectiveness and feasibility of implementing peak shaving strategies at a number of different types of facilities. The firm has analyzed or designed thermal energy storage systems for sizes ranging from 10,000 ton-hours to 50,000 ton-hours. Other approaches have been investigated to reduce a site's electrical demand charge by shifting electrical load from peak electric rate periods. These include direct digital control of large electrical systems and distribution voltage reduction.

Rotating Machinery

Newcomb Anderson Associates has analyzed and designed thousands of pumps and fan systems in all types of commercial and industrial applications and building conditioning systems. This includes river water cooling pumps of 1,500 horsepower each for a nuclear reactor.

Refrigeration

Newcomb Anderson Associates has analyzed or designed refrigeration systems for commercial use including a 10,000 sq. ft. frozen food storage building, refrigerated food processing plant, wineries, breweries, all types of commercial compressors, and associated equipment.

Food Service

Newcomb Anderson Associates' experience in food service energy efficiency includes complete restaurant design, supermarket refrigeration, food processing and packaging, refrigeration heat recovery, and institutional food/meal service.

Water Supply and Distribution Systems

Newcomb Anderson Associates has analyzed the efficiency of numerous water distribution systems for a variety of sites. These range from individual buildings to school campuses, military bases and municipal water systems. Efficiency improvements have been recommended for water production wells, SCADA systems to control the operation of multiple wells, improved pump operations in water treatment plants, and off-peak water pumping. For water end users, efficiency improvements have included reduced flow plumbing fixtures, weather controlled automatic irrigation systems, and horizontal axis washing machines.

Wastewater Systems

Newcomb Anderson Associates has analyzed the efficiency of numerous wastewater treatment facilities, including those for the cities of Carmel, Coalinga, Live Oak, Santa Cruz, Woodland, and Vallejo, as well as the Fallon Naval Air Station. Efficiency improvements have included installing premium efficiency motors, new blowers, more efficient spray aerators and fine bubble aerators in aeration ponds, dissolved oxygen sensors, variable frequency drives (VFD's) on aerator paddles, and VFD's on various pump motors. Additional monetary savings have been realized by implementing electric load shifting and rate schedule conversion.

Cogeneration

Newcomb Anderson Associates has analyzed and/or designed cogeneration plants ranging in size from 30 kW to 421 MW worldwide. We have performed both preliminary feasibility and comprehensive feasibility studies, in which key siting, configuration, sizing, economic, and emissions issues are addressed to various levels of detail. Our work has included owner-representative services in the evaluation of third-party developer proposals, negotiation of thermal sales agreements, and project development. For the US Department of Defense, the firm has evaluated the impacts of base realignment and closure (BRAC) on specific steam sales agreements. This work required evaluation of the electric and thermal loads of the host site, evaluation of the contractual obligations of the US government, and identification of opportunities to mitigate financial losses if the government were to terminate the agreements early. We were the design team leader for design-build cogeneration work with our sister companies. This work has included design oversight of all engineering disciplines, including mechanical, electrical, civil, structural, controls, air quality permitting, large equipment specification, and constructability review of design-build projects. It has required close coordination with the construction team to ensure a smooth design-build process. Our staff has spoken at cogeneration seminars and/or taught cogeneration courses in Mexico, Australia, Great Britain, and New Zealand. Newcomb Anderson Associates is widely recognized for its cogeneration expertise in all sizes and types of applications.

Renewable Energy Sources

Newcomb Anderson Associates has been involved in energy conservation and renewable energy technologies for 19 years. The breadth of renewable energy projects we have been involved in is considerable. Newcomb Anderson Associates has designed lighting systems

that incorporate daylighting and ambient sensing controls. We have worked on large scale photovoltaic array projects, designed repairs to a concentrating solar collector system for a large state building, and designed five refuse derived fuel incinerator/heat recovery boiler plants now built and operating. Newcomb Anderson Associates is recognized as being one of the premier companies involved in the pursuit of reducing facilities' dependence on non-renewable resources.

Design Guidelines

Newcomb Anderson Associates has developed energy efficiency design guidelines both for in-house and client use. In some cases, the guidelines addressed energy efficiency comprehensively, while in other cases, only specific measures or types of equipment were addressed. Newcomb Anderson Associates was co-author of the California Energy Commission's *Energy Efficiency Design Guide for California Detention Facilities*, and was the consulting engineer and primary author of the *Simplified Energy Conservation Measures Guidebook* for the City and County of San Francisco Bureau of Energy Conservation. This guidebook was prepared for facilities staff to be able to make energy efficiency decisions and implement energy efficiency projects.

Proprietary Analysis Tools and Products

Audit Evaluation

Newcomb Anderson Associates has developed a comprehensive set of energy analysis tools, including a preliminary audit evaluator, investment grade audit (IGA) evaluator, and spreadsheets for evaluating specific resource conservation measures (RCM's).

The preliminary audit evaluator was designed as an initial screening tool, comprising a set of custom field data forms and an Excel workbook. The forms were designed to summarize the major energy use system ratings and operations. This information is used in the evaluator workbook to determine approximate savings and cost for the most commonly recommended RCM's. The results are then used to determine the magnitude of energy management potential at the site.

The IGA evaluator works on the same principle as the preliminary audit evaluator but at a detailed level. Over 25 detailed, custom field data forms were created to inventory all aspects of the energy and water use at a facility. The evaluator workbook is used to catalog and organize all of the field data and to screen for over 150 RCM's. The initial screening, in conjunction with the project engineer's knowledge of the site, form the basis of a detailed project evaluation of the RCM's for the site.

Customized Excel workbooks are a method used to calculate the energy savings for specific RCM's. Each workbook has a data input section for the key variables that are unique to the operation of the equipment at that site. All of the calculations, assumptions, and methodologies are documented within the workbook with standard references as applicable.

Newcomb Anderson Associates has also developed a standardized methodology for producing PowerDOE simulations to calculate facility energy use. The methodology utilizes templates for all of the major building components to facilitate data entry. For the building envelope, a grid system is used to consolidate similar zones for use in the PowerDoe simulation. Templates have been established for all of the typical mechanical systems. A library of performance curves for both standard and high efficiency/high performance equipment is available to be used in conjunction with the mechanical system templates. Once the templates are assembled, key variables in each of the templates are modified to reflect the unique operating conditions of the facility being modeled. After all of the component templates are completed, the entire model is calibrated against the site's historical utility use. The calibrated model is then used to simulate proposed RCM's.

Resource Conservation Measure (RCM) Catalog

A resource unique to Newcomb Anderson Associates is our high efficiency product database, for which Newcomb Anderson Associates has evaluated and identified the most efficient products available in over 70 mechanical and electrical equipment categories. This project provides us with a comprehensive encyclopedia of RCM's.

The Vendor Qualification Process consists of an evaluation of the best available technologies for each energy-using system, including comparison of product efficiencies, features, warranty/service support, and service reliability. Newcomb Anderson Associates collected updated technical data including Product Technical Data Sheets, Installation Guidelines, Start-up and Commissioning Procedures, and O&M Procedures from multiple manufacturers of each type of equipment.

Based on the results of this investigation, two to four suppliers of each type of equipment were selected as "best in class". Newcomb Anderson Associates has developed standard technical write-ups and analysis approaches, which include applications, method of achieving energy savings, implementation requirements, physical impacts, and environmental impacts for many of the measures.

EMCOR Energy Edge

www.EMCOR-Energy-Edge.com

The EMCOR Energy Edge is an easy-to-use, Internet based survey tool developed by Newcomb Anderson Associates that allows users to evaluate a building's energy performance and saving potential using DOE-2 simulations. The survey accommodates most institutional and commercial building types nationwide. Data that describe an overview of building operation and type of energy using equipment, as well as historical energy consumption, are entered at the website. Instant benchmarking reports are provided, giving the user a comparison of their facility's consumption to that of similar building types by region. A timely, user-friendly survey report that includes this benchmarking information, an analysis of energy consumption by end-use, an estimate of available energy savings, and a list and description of energy efficiency measures identified for further study, is generated.

The EMCOR Energy Edge survey is a sophisticated, yet inexpensive and convenient tool to evaluate a customer's energy use and serve as a blueprint for improving energy efficiency and lowering operating cost. The EEE tool in its current version is best suited for "pre-walkthrough" screening applications where building users or other stakeholders enter the data before a site visit. A preliminary report can be generated for minimal cost, and follow-up can be made as appropriate, based on the identified potential.

The key benefits to energy service providers include a cost effective screening of potential customers, nationwide, for various services; the ability to gather information about a customer's facility and systems; and the capability to build a database of customer survey data for analysis and reporting of customer load profiles.

Award Winning Designs

Newcomb Anderson Associates has won five awards for energy-efficient designs: a U.S. Federal Energy Management Program (FEMP) award for 1998, the Illuminating Engineering Society (IES) - Golden Gate Section's Illumination Design Award for 1993 and 1994, the Energy User News 1993 Energy and Environment Building Efficiency Award, and Southern California Edison's (SCE's) 1993 Design for Excellence award for energy efficiency design in an industrial facility. Our energy efficient designs have been featured in the periodical *Energy User News* and the book *Green Architecture - A Guide to Sustainable Design*. In addition, Newcomb Anderson Associates has been cited in the *U.S. Congressional Record* for designing systems to reduce energy use in public buildings by the equivalent of over 93,000 barrels of oil annually.

PERSONNEL

Newcomb Anderson Associates has the resources of energy professionals in multiple disciplines. This includes Registered Mechanical and Electrical P.E.'s, Association of Energy Engineers (AEE) Certified Energy Managers, AEE Certified Lighting Efficiency Professionals, AEE Certified Cogeneration Professionals, AEE Certified Energy Procurement Professionals, and many with Master's degrees in Engineering, Architecture, or Business Administration.

John M. Newcomb and Michael K. J. Anderson, P.E., the President and Chief Engineer, respectively, have been exclusively involved in energy engineering for over 25 years. They are widely recognized and respected for innovative energy analyses and design contributions to large scale energy projects worldwide.

Newcomb Anderson Associates' staff has an exceptionally broad base of technical expertise and experience. This includes a wide variety of energy efficiency technologies and strategies and unsurpassed experience in the commercial, industrial, and institutional sectors. We believe this team is unsurpassed in dedication, experience, and expertise in energy engineering in the U.S.

TOOLS & RESOURCES

Among our many resources, Newcomb Anderson Associates' office suite includes a complete engineering equipment facility, a dedicated energy resource library, a manufacturers' reference library, and a product demonstration laboratory. These resource centers are kept up-to-date by technical and support staff and are utilized daily by staff engineers.

We spend a great deal of time in the field and rely extensively on actual field measured data for accurate results. We have an extensive array of sophisticated field testing and recording equipment, including data loggers, digital combustion analyzers, digital clip-on kilowatt meters, digital thermometers and lightmeters, velometers, duct and pipe pressure testing equipment and portable field computers.

The reference library includes over 30 periodicals and newsletters, ASHRAE and NOAA weather data, current rate schedule binders from numerous major utilities, utility rebate program descriptions from utilities nationwide, cost estimating guides, Thomas registers, and major conference proceedings. We also have pertinent publications from the Electric Power Research Institute (EPRI), ASHRAE, Rocky Mountain Institute's E-Source (of which we are a member), and the California Energy Commission (CEC). The library also includes codes and standards that we reference regularly, such as NEMA and California's Title-24.

The manufacturers' data library includes more than 600 binders from various companies with up-to-date catalog information. Numerous lighting, HVAC, controls, and other energy system equipment catalogs are included.

Our product demonstration lab is a central location where we test and display manufacturers' sample products such as high efficiency lamps, reflectors, occupancy sensors, window shading treatments, and programmable thermostats.

Along with these dedicated resource areas, each engineer in the firm is responsible for researching, assembling, and maintaining resources in three to five energy efficiency and related subject areas. These include such categories as CFC regulations, advanced chiller technology, thermal energy storage, and building modeling. All reference material is cataloged and organized in an indexed database. This database includes a complete listing of in-house resources and notes date and location of materials. The database is indexed by title and subject matter and allows fast access to available information.

Newcomb Anderson Associates uses many in-house computerized analysis and design tools, including DOE-2, Visual DOE, Power DOE, Carrier HAP, Trane TRACE, Engineering Equation Solver, Motor Master, FAN to Size, Binmaker, RSPEC! (Reduce Swimming Pool Energy Cost), Lumen Micro, and BLCC. We use proprietary and industry standard software for building energy use analysis, HVAC component sizing design, psychrometrics, pipe and duct layout, pump and air handler selection, advanced hydraulics, and cost estimating.

The Design Division uses Specsintact, MasterSpec and other DOD, DVA, and DOE specification systems to prepare our mechanical and electrical specifications. Our Design Division uses AutoCAD Release 14 for our design drawings. All CAD drawings are produced in-house on a 600 DPI Hewlett Packard plotter.

Our computer work station houses our centralized library of computer software manuals and provides space for the on-going maintenance and upgrade of our firm's computer systems. The office is networked for efficient exchange of electronic files, as well as Internet access for research and email. We maintain a web site at www.newcombanderson.com.

If outside resources are necessary, we first contact PG&E's Pacific Energy Center (PEC), which is located within walking distance of our offices. The PEC has extensive product demonstration displays, a tool lending library, energy design software center, and an excellent reference library with research assistants available for support. Newcomb Anderson Associates can and has access to Lawrence Berkeley National Laboratory, E-Source, Underwriter's Laboratories, manufacturers' facilities, and other demonstration testing laboratories if required.

REPRESENTATIVE PROJECTS

<i>General Information</i>			
Project Title:	IM&V for EEDA Program	Type:	Commercial and Multi-unit Residential
Customer:	City of Oakland	Location:	Oakland, CA
<i>Project Overview</i>			
<p>The City of Oakland created the Energy Efficiency Design Assistance Program to capture opportunities for improving energy efficiency of new construction projects in Oakland. The City utilized California Public Utilities Commission (CPUC) Summer 2000 Energy Efficiency Initiative funds to develop a program designed to take advantage of the City's role in coordinating with building developers and contractors through the permitting process.</p> <p>The initial program was administered by a subconsultant to the City and targeted commercial, industrial, and multi-family construction projects, focusing on Oakland's "Major Projects List" and properties of 50,000 square feet and greater. The scope of the program offering included customized energy efficiency design review assistance at no cost to the participants. The program lasted approximately one year and served 73 participants.</p> <p>One of the CPUC program requirements was that the claimed results of the program be independently verified through an Independent Measurement and Verification (IM&V) study. The City contracted with Newcomb Anderson Associates to perform the IM&V work. Because the EEDA program impacted the design early in the development process, measures to be verified through the IM&V process generally were not installed yet. Thus, the objective of the IM&V program was to provide a rigorous due diligence evaluation of the stipulated savings documentation, independently verify the results, and confirm the likelihood that the measures would actually be installed. This was done with the goal of ensuring the calculations adhere to US Department of Energy (DOE) Federal Energy Management Program (FEMP) and Pacific Gas and Electric Company (PG&E) M&V guidelines, while considering the unique aspects and limited budget of this IM&V Program. Care was also taken to provide copious and detailed documentation of calculations and assumptions used in the IM&V review, particularly where claimed results were adjusted.</p> <p>Newcomb Anderson Associates' responsibilities included developing a detailed IM&V Plan, documentation of the review of each project and associated calculations, and reporting the results of the IM&V effort. A key aspect of the IM&V process was selecting a sample set of sites based on the criteria that they contributed to greater than 2% of the program's expected equivalent annual energy savings.</p> <p>For each measure recommended to the sample sites for which confidence in implementation was above 0%, a full review of calculations leading to the savings estimate was performed. Baseline consumption calculations, input assumptions, calculation methodologies, and reasonableness of outputs were all reviewed. Parallel savings estimates were generated in most cases, and in all cases where DOE-2 modeling was used to generate submitted savings estimates.</p> <p>During the IM&V savings calculation review process, peak summer demand savings estimates were also generated for applicable energy efficiency measures. (Demand savings were not calculated in the original estimates of measure savings, yet were required by the CPUC.)</p> <p>Throughout the IM&V review process, progress meetings were held with the City of Oakland. A meeting was held with PG&E, with City of Oakland representatives in attendance, at the start of the process to ensure that the proposed review methodology was theoretically sound and agreed upon from the outset.</p>			

General Information			
Project Title:	SPC Management	Type:	Various sites
Customer:	Pacific Gas and Electric	Location:	Northern and Central California
Project Overview			
<p>Currently, Newcomb Anderson Associates is providing technical review services for PG&E's Standard Performance Contracting (SPC) Program. Newcomb Anderson Associates has provided technical review for over 150 applications, with incentive amounts ranging from a few thousand dollars up to \$500,000. In this capacity, we review the energy efficiency measures in the applications to ensure they are technically sound and follow program guidelines. The review includes evaluating whether the estimated energy savings are reasonable and are calculated using accepted engineering principles. Actual savings are quantified through a measurement and verification (M&V) plan that is included in the application. The M&V methodology is closely reviewed for thoroughness and accuracy in confirming energy savings. Also, the reviewer checks if the incentive is calculated correctly using the appropriate rates and if the customer has completed all components of the application.</p> <p>Newcomb Anderson Associates also provides technical support for customers who participate in the SPC Program. We have assisted over 50 customers with completion of the lengthy application forms, calculated estimated energy savings unique to each site, developed M&V plans, and have advised them regarding the application processing steps that are required. This work requires field visits to the customer facility, evaluation of the energy consuming systems, analysis of potential energy savings, and recommendation of M&V methods.</p>			

General Information			
Project Title:	Lighting Project Monitoring	Type:	Government Offices
Customer:	Sacramento Municipal Utility District	Location:	Sacramento, CA
Project Overview			
<p>Newcomb Anderson Associates was contracted by SMUD to verify with energy end-use monitoring the actual impact of several large lighting retrofit projects performed in their service territory. Under this program, Newcomb Anderson Associates completed the monitoring of lighting projects in four large State of California office buildings in Sacramento with a combined floor area of 1,690,000 square feet. Newcomb Anderson Associates was responsible for developing the site-specific metering plans, installing the monitoring equipment, analyzing the resultant data, and reporting the results. At each site, Newcomb Anderson Associates monitored the electricity use of selected floors both before and after the lighting retrofit was performed. The results were compared with the engineering estimates of savings that had been used to apply for a utility rebate.</p> <p>The verification of savings was performed with an option B approach as defined in the <i>North American Energy Measurement and Verification Protocol</i>. The electricity use of each fixture type was determined through "spot-watt" measurements before and after the retrofit. The number of fixtures as reported by the retrofit contractor was used to determine the total connected lighting load. The time of use and hours of operation were determined through the selective placement of watt-hour transducers on lighting panels. Continuous monitoring of the energy use of the selected lighting panels was performed for a period of several months in order to establish the operating profiles that were applied to both pre- and post- retrofit lighting loads. The lighting load shapes were determined separately for weekdays and weekends and for office and hallway areas in order to allow SMUD to apply the results to other buildings in the service territory.</p> <p>A follow-on project involved developing metering plans and installing monitoring equipment for a more cursory verification of lighting project energy savings in approximately 50 buildings in the SMUD service territory. Savings were verified by using contractors' records of fixtures installed, published figures of fixture wattage, and short-term metering of post-retrofit operating hours using recording light on-time meters.</p>			

General Information			
Project Title:	Department of Energy Institutional Conservation Program (ICP) Cycle 14	Type:	Educational and Medical Centers
Customer:	California Energy Commission	Location:	Statewide, CA
Project Overview			
<p>Newcomb Anderson Associates participated in the Department of Energy (DOE) Institutional Conservation Program for several annual cycles. For Cycle 14, Newcomb Anderson Associates conducted a series of 14 facility studies for various schools, hospitals, and community colleges participating in the ICP. The ICP is a federal DOE program, administered by the CEC. The sites co-funded the studies.</p> <p>The engineering teams worked closely with site representatives, taking care to pursue projects compatible with the long term plans of the various facilities. Technical assistance reports were prepared, describing the existing energy use, addressing energy concerns of the site, describing all site energy using systems, giving a technical summary of all proposed projects and operating changes, and including appendices with all supporting background data and cost and savings calculations.</p> <p>Project identification and analysis focused on grant fundable projects (those having a simple payback period between 2 and 10 years). Recommended projects varied, but generally included major lighting retrofits using T-8 lamps and electronic ballasts, installation of occupancy sensors, and conversion to more efficient lighting sources. Typical HVAC system projects included installation of central energy management systems and other control improvements, variable frequency drive and motor retrofit projects, and air handler conversion projects.</p> <p>All field work and report preparation was completed over a tight five-month time frame due to the California Energy Commission's program constraints and DOE's grant funding program application deadlines.</p>			

General Information			
Project Title:	Energy Partnership Program	Type:	Governmental
Customer:	California Energy Commission	Location:	Statewide, CA
Project Overview			
<p>Under subcontract to the CEC, Newcomb Anderson Associates completed the engineering analyses, design, or design review of energy conserving retrofit projects for over 400 municipal and county buildings. During each three year cycle of this program, Newcomb Anderson Associates typically provided engineering services to over 50 different California municipal and county facilities. These facilities included hospitals, city halls, police and fire stations, libraries, sheriff's communication centers, courthouses, vehicle maintenance facilities, equipment shops, senior centers, office buildings, pools, well pumps, wastewater treatment plants, water supply systems, central plants and others. Extensive on-site analysis and testing of each facility by Newcomb Anderson Associates engineers resulted in an energy efficiency study, design, or design review.</p> <p>Each energy efficiency study outlined potential energy conserving retrofit projects with complete technical analysis and backup calculations, economic and payback analysis and implementation recommendations. Typical projects included energy efficient lighting retrofits, lighting controls, HVAC controls modifications, small scale cogeneration, boiler optimization and summer boiler shutdown, energy management systems (EMS), variable air volume systems (VAV), various heat recovery modifications, and many others. These studies were generally ASHRAE level III comprehensive energy audits.</p> <p>Under the auspices of the Energy Partnership Program, Newcomb Anderson Associates conducted design reviews for approximately 20 buildings. Many of these design reviews were completed for hospitals or detention facilities, requiring compliance with Office of Statewide Health, Planning and Development policies, incorporation of Board of Corrections guidelines, or incorporation of CEC energy efficiency guidelines for detention facilities.</p> <p>In some cases, Newcomb Anderson Associates was hired by the CEC or directly by the local government to provide design services for the recommended projects. Newcomb Anderson Associates provided all types of design services for this program, ranging from simple design assistance to complete biddable specifications and drawings. As with much retrofit design, each project had unusual circumstances that must be considered.</p> <p>The Energy Partnership Program required a wide variety of specialized technical areas of expertise. Special care was taken to meet the unique needs of each facility and the widely varying energy expertise of the individuals responsible for them.</p>			

General Information			
Project Title:	Small School District Energy Assistance Program	Type:	Educational
Customer:	California Energy Commission	Location:	Statewide, CA
Project Overview			
<p>For 8 years, Newcomb Anderson Associates was the prime contractor for the California Energy Commission's Small School District Energy Assistance Program (SSDEAP). This program provided complete technical engineering assistance to California Small School Districts (ADA<2,501). Historically these districts, due to their relatively small size, did not have the financial or technical ability to participate in the existing major public energy programs. This program addressed the unique needs of these small school facilities and provided a loan program, design services, installation assistance and energy use monitoring in addition to basic technical audits and project identification. Over one hundred school district sites were audited by Newcomb Anderson Associates under this program.</p> <p>Typical projects included lighting fixture and controls retrofits, outside air economizers, intermittent ignition devices, energy management systems, eliminate use of electric space heating, install swimming pool covers, and alternative utility rate schedules. The response to this program was overwhelmingly positive, both in concept and results.</p>			

General Information			
Project Title:	Boiler Replacement and Conversion to Low Pressure Steam	Type:	Medical Center
Customer:	Alta Bates-Herrick Hospital	Location:	Berkeley, CA
Project Overview			
<p>Newcomb Anderson Associates conducted an energy use analysis of Herrick Hospital. As a result of this analysis, it was recommended that the high pressure boilers in the central plant be replaced with low pressure boilers and the hospital piping system be converted to a low pressure system.</p> <p>Newcomb Anderson Associates provided the mechanical design and specification for this project and were the overall lead engineers. Construction supervision and asbestos removal specifications were also provided by Newcomb Anderson Associates.</p> <p>The design included the removal of three existing 141 horsepower boilers and pumps, and the installation of three new low pressure boilers. The entire steam piping system of the hospital was analyzed and altered to handle low pressure steam. A temporary boiler plant was designed outside of the central plant in the parking lot so the steam system could continue to operate during asbestos removal and boiler demolition in the central plant. This project was highly unusual and challenging in that a high pressure system was converted to low pressure while the system continued to operate during construction. This project was completed on time and within budget, is operating successfully and is realizing annual savings of almost \$200,000. At an awards dinner, the president of the California Society of Hospital Engineers called it one of the highest quality and most successful engineering projects he had ever seen.</p>			

General Information			
Project Title:	Cogeneration Project Management Services	Type:	Medical Centers
Customer:	Department of Health and Community Services	Location:	Melbourne, Victoria, Australia
Project Overview			
<p>Newcomb Anderson Associates managed the cogeneration project development of 36 MW of combined cycle cogeneration plants located in large public hospitals in and around Melbourne, Australia. Newcomb Anderson Associates was the lead for a team of consultants that provided technical, financial, and contractual assistance to the Department of Health and Community Services (DHCS) in all steps required to bring the cogeneration project from the feasibility analysis stage into commitment of funding by a third-party developer.</p> <p>The project consists of seven steam-injected gas turbine-generators based on the Allison 501-KH STIG cycle turbine located at six hospital sites. A total of eight hospitals will be provided with steam from this project. Steam from the cogeneration plants is utilized at the hospitals for space and water heating, laundries, and instrument sterilization. Approximately half of the electricity produced is sold to six of the hospitals, with the remainder sold to the State Electricity Commission.</p> <p>Newcomb Anderson Associates initially developed the "business as usual" electric and fuel profiles for each of the eight hospitals included in the project. These profiles were used as a basis for preliminary equipment selection. In addition, Newcomb Anderson Associates conducted energy surveys to identify energy conservation opportunities that could be undertaken in conjunction with cogeneration.</p> <p>Newcomb Anderson Associates then assisted DHCS in preparing a "Request for Proposals" for third-party developers for the cogeneration project. The Newcomb Anderson Associates team assisted DHCS in reviewing the proposals, interviewing the bidders, and selecting a winning bid for the project.</p> <p>After the winning bid was selected, Newcomb Anderson Associates provided a full time project manager to guide project negotiations through the development phase. This phase of work included reconfirming and updating energy use profiles; conducting site reviews and construction work planning meetings at each of the hospital sites; and reviewing the developer's preliminary engineering, operations, and maintenance plans and environmental and planning applications. This phase also included negotiating all major project contracts, including energy services agreements and site leases between the developer and DHCS and gas supply and electricity buyback contracts with each utility.</p> <p>Project development was completed and financing was committed in March 1993, making this the first project of its kind in Australia. The first plant became operational in June 1994.</p>			

General Information			
Project Title:	Various Programs	Type:	Various
Customer:	PG&E Energy Engineering Technical Assistance	Location:	Northern and Central California
Project Overview			
<p>Newcomb Anderson Associates has provided a wide variety of energy engineering services to Pacific Gas and Electric (PG&E). This work has involved ASHRAE level II and level III audits for commercial, governmental, and industrial facilities; energy efficiency design reviews of new construction; reviews of DSM bids and customized incentive applications; development of energy programs; training of utility staff; energy project measurement and verification; and a wide variety of other energy engineering services as requested by the utilities.</p> <p>Newcomb Anderson Associates has provided a wide variety of energy engineering services to Pacific Gas and Electric (PG&E). This work has involved ASHRAE level II and level III audits for commercial, governmental, and industrial facilities; energy efficiency design reviews of new construction; reviews of DSM bids and customized incentive applications; development of energy programs; training of utility staff; energy project measurement and verification; and a wide variety of other energy engineering services as requested by the utilities.</p> <p>Under contracts with the PG&E Marketing Department, Newcomb Anderson Associates has prepared many DSM site survey reports for PG&E's customers. We have prepared these reports for a wide variety of facilities, including heavy rail facilities [the Bay Area Rapid Transit (BART) District], hospitals, schools, hotels, telecommunications industry (Pacific Bell) offices and communications facilities, County justice and health facilities, high rise office buildings, industrial processing plants, computer manufacturing facilities, food processing and distribution plants, and many other types of facilities.</p> <p>We have reviewed for PG&E the design of planned renovations or new facilities for energy efficiency. We have provided these services to the San Francisco Mint, Lincoln High School, and others. We also reviewed and commented on the energy efficient aspects of IBM's in-house specification for new equipment. Additionally, we provided sample text for clauses and requirements that would provide IBM with more efficient equipment.</p> <p>We have completed several energy efficiency surveys or design reviews specifically for potential participation in PG&E's Off-peak Cooling Program, including Marine World-Africa U.S.A., Corc Pork, and the investigation of the potential for off-peak cooling in wineries. This work has involved resolution of technical issues identified by PG&E and the engineering assessment of new or unproven technologies and production processes.</p>			

General Information			
Project Title:	Various Programs	Type:	Various
Customer:	PG&E Energy Engineering Technical Assistance	Location:	Northern and Central California
Project Overview			
<p>Newcomb Anderson Associates has had several contracts reviewing Customized Incentive applications for PG&E. We have reviewed over 700 applications under several Customized Incentive programs. We co-authored the Customized Incentive Program Resource Binder for PG&E, which is used as the technical basis for all customized incentive applications. We have prepared Customized Incentive Program applications under contract to PG&E or for the clients directly. We have also worked with local PG&E office staff to repair numerous incentive applications to meet program requirements.</p> <p>Newcomb Anderson Associates has provided other program development, implementation support, and technical quality assurance services for PG&E. We were PG&E's technical consultant for their very successful pilot demand side bidding program, PowerSaving Partners (PSP), trained PG&E staff on the use of the Customized Incentive Program Resource Binder, drafted the Reviewer's Guide for the Retrofit Efficiency Options (REO) Program, co-authored the Customized Efficiency Options (CEO) Program manual, and provided technical services for the Integrated Resource Bid (IRB) demand and supply side auction.</p> <p>Newcomb Anderson Associates has provided a variety of DSM program development support services for PG&E. We reviewed and commented on several analyses or programs in progress: the 1992 Customized Rebate Program, another consultant's work for determining equivalent full load cooling hours, a proposed EMS Worksheet for EMS rebate applications, the 1993 Direct Rebate Program documentation for HVAC equipment, and Business Edge Small Commercial Energy Management.</p> <p>Other DSM program development or other technical support Newcomb Anderson Associates has provided to PG&E includes determining appropriate labor costs for rebate program equipment, analyzing economic information for the utility to use to determine the merits of including heat pumps in rebate programs, compiling information of air conditioning equipment incremental costs, and researching and compiling estimates of typical building envelope and air conditioning system characteristics of specified facilities and cities. This work has often required tight deadlines, sometimes even less than one day, and Newcomb Anderson Associates has always met these deadlines.</p> <p>Newcomb Anderson Associates recently provided all technical, site survey, and metering work for PG&E's 1996 Commercial End Use Survey. This project involved data collection for utility research as mandated by the State legislature. This effort included organizing and reviewing over 3,000 PG&E customer sites and actual on-site surveys of over 1,000 sites representing all sizes and types of commercial customers. This work also included metering and monitoring at 100 sites. Working closely with PG&E, this 18-month effort provided thorough, detailed and accurate modeling information about PG&E customers in an extremely consistent manner. A Newcomb Anderson Associates team of a dozen full-time staff carried out this effort, including generating organizing practices, detailed data collecting techniques, metering plans, and data checking protocols.</p>			

General Information						
Project Title:	Comprehensive Energy and Water Resource Audits for Four Navy Sites		Type:	Military		
Customer:	Edison Envest		Location:	Southern California		
Project Overview						
<p>Edison Envest contracted with Newcomb Anderson Associates to perform energy engineering services at various U.S. Navy facilities. Under this contract, Newcomb Anderson Associates has performed comprehensive (ASHRAE level III) energy and water audits for the majority of the buildings at MCLB Barstow, MCAGCC Twenty-Nine Palms, NWS Seal Beach, and NWAD Corona, for a total of approximately 10 million square feet. Newcomb Anderson Associates also prepared funding documents DD1391 and accompanying life cycle cost analyses.</p> <p>Through these energy and water efficiency studies, a wide variety of operations and maintenance measures, energy conservation measures, water conservation measures, and utility measures were recommended. The HVAC measures included installing DDC EMCS's, installing programmable thermostats, decommissioning central boiler plants and installing localized, dedicated equipment, replacing forced air heating with radiant heating, replacing chillers with higher efficiency chillers, installing variable frequency drives on fan and pump motors, converting constant volume air handlers to variable air volume, and replacing heating systems. Other energy projects involved replacing lighting sources with more efficient sources, installing occupancy sensor-based lighting controls, replacing standard motors with premium efficient motors, controlling air compressors for electric load shedding, peak electric demand shaving, and repairing solar pool heating systems. Recommended water conservation measures included installing new showerheads, installing water closet retrofit kits for toilets and urinals, installing low flow aerators for sinks. Utility interconnection and billing processes were also analyzed and recommendations for improvement were made. Cogeneration systems were also evaluated. Projects to commission and improve the efficiency and control of well pumping stations were also identified.</p> <p>The comprehensive energy and water audits identified over \$4,000,000 per year in energy and water cost savings for the evaluated portions of the sites at a cost of approximately \$17,800,000, for an overall simple payback period of approximately 4 years.</p>						
Site Name(s)	Audited Area (sq. ft.)	Existing Utility Cost (\$/yr)	Estimated Cost Savings (\$/yr)	Monetary Savings (%)	Estimated Construction Cost	Approx. Simple Payback (yrs)
MCLB Barstow	4,674,000	3,765,684	1,650,515	28	6,633,776	4.0
MCAGCC Twenty-nine Palms	3,929,000	6,767,112	1,393,994	22	5,845,467	4.2
NWAD Corona	357,093	831,574	93,439	12	453,711	4.9
NWS Seal Beach	789,573	861,536	326,921	37	1,378,979	4.2
Total	9,749,666	12,225,906	3,464,869		14,311,933	
Average				28		4.1

General Information

Project Title:	SAVEnergy Program	Type:	Government - Various
Customer:	U.S. Department of Energy	Location:	Central and Western United States
<i>Project Overview</i>			
<p>Newcomb Anderson Associates has two contracts to provide energy savings performance contract (ESPC) studies for federal facilities under the auspices of DOE's SAVEnergy Program. These contracts cover two DOE regions in the western U.S.: Region 8 serves Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming. Region 9 serves Arizona, California, Guam, Hawaii, Nevada, the Trust Territory of the Pacific Islands, Alaska, Idaho, Oregon, and Washington.</p> <p>Work is prescribed by work authorization, either for a comprehensive or comprehensive plus energy and water conservation audit and action plan. The vast majority of work has involved comprehensive plus energy audits. To ensure the accuracy of energy savings calculations, the comprehensive plus energy audits include detailed energy balances that calibrate audited energy use to 95 to 100% of historical billed energy use. Once the balances are complete, the percentages of energy attributed to the end-uses are compared with those for similar facilities for reasonableness. The comprehensive energy studies document current energy use to a lesser degree, but audited energy use is compared with historical bills for reasonableness. Energy use and cost indices are compared with those of similar facilities to ascertain the relative magnitude of energy use and energy savings potential. Water users are also surveyed. Standard federal (FEMP) electronic forms on the applicability of renewable energy sources are completed and sent to the National Renewable Energy Laboratory (NREL). The cost estimates include FEMP Building Life Cycle Costing (BLCC) analyses.</p> <p>To-date, Newcomb Anderson Associates has completed energy and water conservation studies for over 40 federal facilities in these two western regions. These facilities have included a wide variety of functions and construction types, including historical buildings. They have included Air National Guard bases, forestry labs, visitor centers and display areas, laboratories, hospitals, post offices, office buildings, national park headquarters and dormitory facilities, and high security Department of Energy sites. Sites include Yellowstone National Park, Rocky Mountain National Park, Portage Glacier, Air National Guard facilities at Boeing Field, and the Riverside Salinity Lab. These studies involve a wide range of energy and water suppliers and agreements, site regulations, user needs, and climate ranges, with corresponding attention to detail in the analyses.</p> <p>Recommended interior and exterior lighting projects have generally included source efficiency improvements, including fluorescent T-8 lamps and electronic ballasts, conversion from incandescent to fluorescent or LED (for exit signs), and conversion to high pressure sodium, and control improvements (occupancy sensors and/or photocell controls). Recommended HVAC projects have generally included measures such as building envelope improvements, programmable thermostats, higher efficiency equipment, premium efficiency motors, and energy management and control systems. Other projects have included power factor correction measures, domestic hot water system improvements, and operations and maintenance measures.</p>			

General Information			
Project Title:	Energy Engineering Services	Type:	Military
Customer:	U.S. Navy	Location:	Southwestern United States
Project Overview			
<p>The U.S. Navy, Southwest Division Naval Facilities Engineering Command, contracted with Newcomb Anderson Associates to perform energy engineering services at various DOD facilities. Under this contract, Newcomb Anderson Associates has performed energy engineering services at NAS Fallon, White Sands Missile Range, MCLB Barstow, MCB Camp Pendleton, NAF El Centro, eight central steam and hot water plants in the San Diego area, and NAS Miramar. Newcomb Anderson Associates also prepared funding documents DD1391 and accompanying life cycle cost analyses.</p> <p>Energy engineering services for MCB Camp Pendleton involved the analysis of repairs to a solar energy system and installation of pool covers for training tanks and the preparation of performance specifications for a design-build contract to implement the project. Energy engineering services for the San Diego central plants involve plant efficiency studies for eight central heating plants at seven naval bases and investigation of the feasibility and cost effectiveness of potential efficiency improvements. This study also includes the evaluation of decentralized system alternatives, evaluation of maintenance and labor practices, and the financial analysis of current cogeneration contracts. A follow-on contract to this project involved evaluating potential thermal loads, operating scenarios, and contractual/financial implications for one of the cogeneration plants in light of base use changes due to base realignment and closure (BRAC).</p> <p>Energy engineering services for MCLB Barstow involved a comprehensive energy analysis of the potential for a direct digital control (DDC) energy monitoring and control system (EMCS) for a portion of the facility. Energy engineering services for NAS Fallon, White Sands Missile Range, NAF El Centro, and NAS Miramar involved comprehensive energy and water audits and efficiency improvement recommendations for portions of the facilities.</p> <p>Through these energy efficiency studies, a wide variety of operations and maintenance measures, energy conservation measures, water conservation measures, and utility measures were recommended. The HVAC measures included installing DDC EMCS's, installing programmable thermostats, decommissioning central boiler plants and installing localized, dedicated equipment, replacing forced air heating with radiant heating, replacing chillers with more efficient chillers, installing variable frequency drives on fan and pump motors, installing dedicated package units and shutting off air handlers, replacing heating systems, and installing building insulation. Other energy projects involved replacing lighting sources with more efficient sources, installing occupancy sensor-based lighting controls, installing food storage refrigeration heat recovery systems, replacing standard motors with premium efficient motors, controlling air compressors for electric load shedding, peak electric demand shaving, installing solar pool heating system and covers, and installing aerator blower motors for sewage treatment systems. Recommended water conservation measures included installing new showerheads, installing retrofit kits for toilets and urinals, installing low flow aerators for sinks, and installing food storage refrigeration condenser cooling towers. Utility interconnection and billing processes were also analyzed and recommendations for cost reductions were made.</p>			

General Information			
Project Title:	Energy Engineering Services	Type:	Military
Customer:	U.S. Navy	Location:	Southwestern United States
Project Overview			
<p>The study for MCLB Barstow was limited to an evaluation of the potential for EMCS control of lighting and HVAC systems in a portion of the base. Approximately \$120,000 per year in energy savings were identified. The comprehensive energy and water audits for NAS Fallon, White Sands Missile Range, NAS Miramar, NAF El Centro identified over \$950,000 per year in energy and water cost savings for the evaluated portions of the four sites at a cost of approximately \$4,800,000, for an average simple payback period of approximately 5 years. The central plant efficiency study identified \$1,459,963 per year in energy and labor savings at a cost of \$4,842,682, for an overall simple payback period of 3.3 years.</p>			

General Information			
Project Title:	In-House Energy Management (IHEM) Projects	Type:	High Technology Facilities; National Park
Customer:	Lawrence Berkeley National Laboratory	Location:	Berkeley and San Francisco, CA
Project Overview			
<p>Newcomb Anderson Associates has a five-year contract to provide energy engineering services to assist Lawrence Berkeley National Laboratory's In-house Energy Management (IHEM) Group implement large scale energy efficiency improvement projects.</p> <p><u>Building 50 Complex Energy Monitoring and Control System (EMCS) Programming</u></p> <p>LBNL expanded their Barrington EMCS to the Building 50 Complex. LBNL contracted with Newcomb Anderson Associates to develop sequences of operation for air handlers and central plant equipment. The goals of the project were to develop sequences that would minimize energy use and optimize equipment operation and then to program the system, monitor the operation and verify the performance of the sequences. The main equipment in the scope of this work included chillers, cooling towers, steam boilers, hot water boilers, domestic water heaters, and air handlers.</p> <p><u>Building 50 Complex Cooling Energy Efficiency Study</u></p> <p>The purpose of this study was to analyze the equipment, configuration, annual cooling load, and operation and maintenance procedures of LBNL's Building 50 Complex cooling systems and to recommend retrofit projects to replace the existing CFC-refrigerant chillers with new, high efficiency chillers based on most favorable life cycle costs. The retrofit projects studied included high efficiency chillers, thermal energy storage, and gas-fired chillers.</p> <p>To determine the existing chillers base case energy use, chiller efficiency tests and chiller monitoring was performed. The chiller efficiency tests determined chiller energy consumption in kW per ton at several operating points. Chiller kW monitoring was then performed for a several-week period in the winter and summer seasons. A regression analysis was performed to correlate chiller kW with outside air temperature. A bin temperature analysis was then performed to project annual cooling loads at various temperature bins.</p> <p>Potential projects were modeled using the bin temperature cooling load profiles developed in modeling the base case. Energy savings, as well as anticipated installation costs, were calculated for each option studied. The option of installing high efficiency, R-22 screw chillers to meet the buildings future cooling needs was determined to be the most cost effective option.</p> <p><u>Sitewide DDC EMCS Design, Groups 1 and 2</u></p> <p>Newcomb Anderson Associates has designed an over 2,000 point expansion of the Barrington EMCS to other buildings at LBNL. This work entailed detailed surveys of all HVAC equipment in the project buildings, development of points lists and sequences of operation, including additive alternates, and complete biddable specifications and drawings. This project is unusual in that Newcomb Anderson</p>			

General Information			
Project Title:	In-House Energy Management (IHEM) Projects	Type:	High Technology Facilities; National Park
Customer:	Lawrence Berkeley National Laboratory	Location:	Berkeley and San Francisco, CA
Project Overview			
<p>Newcomb Anderson Associates provided all detailed construction drawings, including complete wiring diagrams for all systems and equipment. This resulted in over 200 CAD drawing sheets with extremely detailed specifications and operating requirements. This will result in one of the largest successfully operating energy management systems in the United States.</p> <p><u>Premium Efficiency Motor Selections and Specification</u></p> <p>Newcomb Anderson Associates surveyed approximately 790 3-phase motors in 62 buildings and selected appropriate premium efficiency motors for replacement. Replacement decisions were based on motor horsepower, voltage, actual loading, measured speed of the motor and driven device, location, and physical constraints. Selections were chosen using Washington State's Motor Master + in conjunction with the collected measured data. All of the new motors were selected to optimize the motors' load and efficiency. Newcomb Anderson Associates also selected synchronous belts and sheaves for one building to be used in a feasibility study to determine the effectiveness of the belts. In some cases, noise abatement material was selected because the motors were close to a noise sensitive area.</p> <p><u>Energy Efficiency Studies</u></p> <p>Newcomb Anderson Associates has performed a wide variety of energy efficiency studies for LBNL, both at the lab and for other federal clients. These comprehensive studies have included an evaluation of replacement of single phase motors with premium efficiency motors throughout the lab, decentralization of a compressed air plant, and energy audits of high technology facilities and processes, including clean rooms, ultra high vacuum cooling facilities, particle accelerator low conductivity cooling loops, super computing center, and precision optical laboratories. These facilities and processes often have extremely specific space temperature, humidity, and air flow needs, requiring careful selection and development of energy projects. At the request of LBNL, Newcomb Anderson Associates has also performed energy efficiency studies for seven FAA facilities, including Air Route Traffic Control Centers, Air Traffic Control Towers, and other types of high technology facilities. These studies required careful evaluation of the lighting and HVAC needs of highly sensitive computer equipment.</p> <p><u>Submetering Master Plan</u></p> <p>Newcomb Anderson Associates developed an updated methodology for the charge-back of metered electrical use of selected Lawrence Berkeley National Laboratory facilities. Facilities included in the scope of this work were generally shared by multiple LBNL divisions and the cost for the electricity use was to be charged to the appropriate division.</p>			

General Information			
Project Title:	In-House Energy Management (IHEM) Projects	Type:	High Technology Facilities; National Park
Customer:	Lawrence Berkeley National Laboratory	Location:	Berkeley and San Francisco, CA
Project Overview			
<p>The submetering master plan was outlined in detail by area and included a detailed summary of existing, obsolete, and proposed meters. Newcomb Anderson Associates developed proration formulas that can be applied to the monthly meter readings as reasonable estimates of the electricity use by division. The proration formulas were based on observations of occupancy patterns and a review of the load components and densities of each area. Other recommendations for further study and submetering strategies were also discussed in the report.</p> <p><u>San Francisco Presidio DSM Projects</u></p> <p>Newcomb Anderson Associates has been working with Lawrence Berkeley National Laboratory and the U.S. Park Service to implement a variety of energy saving projects at the Presidio National Park, San Francisco. LBNL and the Park Service had submitted a winning bid under Pacific Gas and Electric Company's PowerSaving Partners demand side bidding auction. After the award was made, LBNL requested that Newcomb Anderson Associates assist in choosing, developing, and implementing the energy efficiency measures.</p> <p>The work includes performing initial energy audits of the various facilities at the Presidio to determine energy savings potential, performing in-depth energy analysis for viable projects, developing measurement and verification plans and maintenance and monitoring plans for submission to PG&E, and monitoring and quantifying project performance for utility payments. The measurement and verification plans must meet stringent PG&E and California Public Utilities Commission protocols. The work also includes managing and scheduling a variety of energy projects at the site, negotiating with the utility on contractual issues as they arise, and assisting the client in preparing an RFP for selecting a short list of developers for third-party construction and financing of projects. Preparation of the RFP involved developing in-depth base case information for two of the buildings at the site as well as developing questions on hypothetical additional projects to check the developers approach to problem-solving.</p> <p>To-date, lighting, HVAC, and boiler plant projects have been implemented as a part of this project, resulting in utility payments of approximately \$340,000 per year. These projects have been funded by the Presidio or its tenants. Future projects are expected to be financed through the RFP for third-party construction/financing.</p>			

General Information			
Project Title:	Energy Audit, Project Design and Specifications	Type:	Government Office Building; Hall of Justice; Medical Center
Customer:	County of San Mateo	Location:	San Mateo, CA
Project Overview			
<p>Under the California Energy Commission's Energy Partnership Program, Newcomb Anderson Associates conducted complete energy analyses for three San Mateo County facilities: the County Office Building (COB), Hall of Justice (HOJ), and Chope Hospital. We recommended projects that would reduce energy costs for these facilities by 15%, 18%, and 16%, respectively. These projects include more efficient lighting, lighting and HVAC controls, upgrading an energy management system, efficiency improvements in the domestic hot water loop, and efficiency improvements to other mechanical and electrical systems.</p> <p>Under a later contract completed directly for the County, Newcomb Anderson Associates provided design assistance for the lighting, HVAC, and mechanical systems projects that we had recommended. We also provided complete design and specifications for the recommended DDC EMS that will serve the County Office Building and Hall of Justice.</p> <p>Lighting project design was formulated to reduce connected load and minimize unnecessary lighting operation. The primary load reduction project was the conversion of light fixtures to accept T-8 lamps and electronic ballasts. Fixture delamping was evaluated and specified on a case by case basis, sometimes in conjunction with lens replacement and optical reflector installation. Incandescent fixtures were replaced or rebuilt to accept fluorescent lamps. Occupancy sensor controls were specified where feasible. In other areas, lighting control was incorporated into the energy management system.</p> <p>In the HOJ, the EMS controls two central chillers, four space heating hot water pumps, three single zone air handlers, two dual duct air handlers, and three dual duct, VAV air handlers. In the COB, the system controls two central boilers, the central chiller, the multizone air handler system consisting of five supply fans, an exhaust fan and a return fan, and the lighting operation throughout the building. A total of 192 points are used to control these systems.</p>			

General Information			
Project Title:	High Efficiency Lighting, Mechanical, and Controls Design	Type:	Industrial
Customer:	VeriFone	Location:	Costa Mesa, CA
Project Overview			
<p>VeriFone Incorporated built out a 76,000 square foot shell building for an expansion of their activities in an adjacent building. VeriFone's corporate philosophy encourages the construction of highly energy efficient, ecologically sound and environmentally safe facilities. This building is intended to be a showcase for that philosophy. VeriFone selected Newcomb Anderson Associates to design the highly efficient mechanical and electrical systems and their controls. The design received Southern California Edison's 1993 Design for Excellence award competition for energy efficient design of an industrial facility. The design also won the Energy User News 1993 Energy and Environment Building Efficiency Award.</p> <p>The building incorporates state-of-the-art energy efficient systems. The lighting system incorporates daylighting and ambient light sensing controls, low general light levels and task lighting in offices, occupancy sensing controls, and T-8 lamps and electronic ballasts throughout. The HVAC system uses variable flow air handling units equipped with variable speed drives. A two-stage, gas-fired absorption chiller provides cooling and heating for the facility, resulting in reduced operating costs and avoidance of ozone depleting and global warming refrigerants. A sophisticated, central, DDC building automation system provides efficient control of all energy using equipment in the facility.</p> <p>The estimated electricity use of this facility, if it were designed to meet the minimum requirements of the California Title 24 energy efficiency standards, would be 570,000 kWh per year. However, due to the highly efficient technologies recommended and designed by Newcomb Anderson Associates, the actual electricity use at the site is projected to be 231,600 kWh per year, a reduction of nearly 60%. The average on-peak electric demand is estimated to be reduced by 84 kW, from 163 to 79 kW.</p> <p>Because cooling is provided by natural gas instead of electricity, the fuel use of the facility is expected to be slightly higher than the fuel use of the facility if designed to meet minimum Title 24 requirements, 6,950 therms per year versus 6,170 therms per year. However, the total annual energy costs for the VeriFone building as designed by Newcomb Anderson Associates will be \$38,700 less than the annual energy costs for the facility if designed to meet minimum Title 24 requirements. This is a 54% reduction in annual energy costs, from \$72,100 to \$33,400 per year.</p> <p>The energy efficiency measures incorporated into the design were eligible for utility funding from both Southern California Electric Company (SCE) and Southern California Gas Company (SoCal Gas). Newcomb Anderson Associates provided detailed analysis of expected energy savings to support applications for this funding. SoCal Gas provided \$48,000 in demonstration funds to help offset the higher first cost of the high efficiency gas-fired chiller. An incentive of \$73,000 was obtained from SCE through their Design for Excellence program to help offset the higher cost of the energy efficiency measures that resulted in electricity savings.</p>			